

# Highland-Pigeon Watershed Restoration Action Strategy

## Part II: Concerns and Recommendations

*Prepared by*  
Indiana Department of  
Environmental Management  
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## **Foreword**

The First Draft (October 1999) of the Watershed Restoration Action Strategy (WRAS) was reviewed internally by IDEM and revised accordingly. The Second Draft (Spring 2000) was reviewed by stakeholders and revised accordingly. This Third Draft (June 2000) is intended to be a living document to assist restoration and protection efforts of stakeholders in their sub-watersheds. As a "living document" information contained within the WRAS will need to be revised and updated periodically.

The WRAS is divided into two parts: Part I, Characterization and Responsibilities and Part II, Concerns and Recommendations.

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# Highland-Pigeon Watershed Restoration Action Strategy

## Part II: Concerns and Recommendations

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Part II of the Watershed Restoration Action Strategy discusses the water quality concerns identified for the Highland-Pigeon Watershed and lists recommended management strategies to address these concerns.

Part II includes:

Section 1	Water Quality Concerns and Priority Issues Identified by Stakeholder Groups
Section 2	Water Quality Concerns and Priority Issues Identified by State and Federal Agencies
Section 3	Identification of Impaired Waters
Section 4	Priority Issues and Recommended Management Strategies
Section 5	Future Actions and Expectations

### 1 Water Quality Concerns and Priority Issues Identified by Stakeholder Groups

The Highland-Pigeon watershed contains potential stakeholder groups that have different missions. Many of these groups have a long history of working in the Highland-Pigeon watershed. The following discussion briefly describes some of the watershed groups and lists their priorities and concerns.

#### *Pigeon-Highland Steering Committee*

The Pigeon-Highland Steering Committee is working towards reducing sediment loading to Pigeon Creek and its tributaries. The other main concern of the group is the high E.coli levels recorded from their monitoring. They are trying to determine where the E.coli source(s) originate and develop a plan of action to try and reduce the source. Cost-share dollars through section 319 grants and the USDA Conservation Reserve Program will be used for the installation of more filter strips along creeks and streams (Obenshain, 1999).

Septic systems are a concern because some of the soils have very poor permeability. Other problems with septic systems are poor installation during the construction or old systems that have straight pipe outlets. More information is needed to determine the significance of septic system problems (Obenshain, 1999).

#### *Southwest Indiana Brine Coalition*

The Southwest Indiana Brine Coalition is presently targeting brine sites located in Posey, Vanderburg, Warrick, Gibson, and Pike Counties, that do not have an identified oil extraction operator. They provide technical and possibly financial assistance to landowners with land that has soils of high saline concentration from old oil extraction sites. These areas are called brine sites and range from one half to five acres.

Oil and gas drilling activities are quite prolific in Pike and Gibson Counties. In the process of extraction, oil related problems such as salt water and oil spills have impaired water and soil quality. Brine sites on hillsides cause deep gully erosion from the lack of a vegetative cover. The contaminated sediment moves downhill which continues to sterilize more acres. (Hazlewood, 1999) Sites that are close to watercourses are a high priority. The number of brine sites within the five counties has yet to be determined.

The next phase of the Brine Coalition is to provide education and possibly technical cost-share assistance toward improving the brine sites. The best solution, thus far, is the building up the soil organic content by incorporating animal manure, wood chips, grass clippings, etc. Tall wheat appears to be one vegetation that has grown in some brine areas. (Hazlewood, 1999)

### *Local Health Departments*

In the Highland-Pigeon watershed, the county average of new and repaired septic system permits issued is approximately 130. Counties with zoning and planning have minimum lot size requirements, while those without zoning and planning make acreage suggestions. All the counties in the Highland-Pigeon watershed require that each site have a soils report. Depending upon the soil type, some of the standard septic systems function properly, while others fail to percolate because of high clay content and fragipans. Most of the systems have installed a perimeter drain at the fragipan depth to help lower the water table (depending on the soil type). In some areas, mound systems are installed and function properly (Franz, 1999).

There are numerous septic systems that don't function properly scattered throughout the Highland-Pigeon watershed. The following is a list of possible reasons why:

- lot sizes are too small
- poor soils
- lack of septic system management
- increased water intake into system from availability of public water
- the filter field is too small
- weather
- poor building site selection
- misconception that septic systems are the same as sewer systems.
- septic tank not emptied frequently (every two to five years, depending upon the number within the household and if a garbage disposal is used)
- decomposing bacteria die from grease and other harmful items
- laundry (should be done in little amounts and more often)

There is an undetermined amount of septic systems with straight pipe outlets that discharge septic effluent on the soil surface, in road ditches, in drainage field tiles, down hill sides and draws, etc. These systems create a health hazard from the possibility of spreading a disease and are illegal.

There are two ways these illicit discharges get upgraded to county standards:

- the owner sells the property and must disclose it, or
- a complaint is filed.

Education is an ongoing need. Even though many receive individual education about septic system management; in time, homeowners forget or don't believe that their systems will experience problems.

As urban growth continues throughout the watershed, more and more homes are being connected to municipal sewer systems. The community of Francisco is presently planning to install a lagoon system because of the many failing septic systems within the area (Dye, 1999).

### *Soil and Water Conservation Districts*

In 1997, the Soil and Water Conservation Districts in Gibson, Pike, Posey, Vanderburgh, and Warrick counties held public meetings to identify local natural resource concerns. The following concerns were raised at those meetings:

- Drainage and maintenance
- Erosion control
- Farmland protection
- Straighten, dredge, clean up Pigeon Creek
- Soil erosion
- Water quality (sedimentation)
- Storm water drains and outlets
- Combined Sewer Overflows
- Urbanization causing excessive flooding

Sedimentation in the streams, is a major concern that has been identified by the local Soil and Water Conservation Districts, Natural Resource Conservation Service and IDNR Division of Soil Conservation in Gibson, Posey, Vanderburgh, and Warrick counties (Rice, 1999; Noble, 1999; Steeples, 1999; Droege, 1999).

The SWCD's of Gibson and Vanderburgh counties assist in sponsoring "Annual Clean-Up Days" to help promote more water quality education.

## **2 Water Quality Concerns and Priority Issues Identified by State and Federal Agencies**

This section presents the combined efforts of state and federal agencies, and universities (such as IDEM, IDNR, USDA-Natural Resources Conservation Service, Ohio River Valley Water Sanitation Commission, Purdue University, Indiana University, Indiana Geologic Survey, and US Geological Survey) to assess water quality concerns and priority issues in the Highland-Pigeon Watershed. This multi-organization effort formed the basis of the Unified Watershed Assessment for Indiana. At this time, the Unified Watershed Assessment has been completed for 1998 and 2000-2001, as described below.

### **Indiana's 1998 Unified Watershed Assessment (UWA)**

The UWA workgroup gathered a wide range of water quality data that could be used to characterize Indiana's water resources. These data were used in Alayers@ in order to sort the 8-digit HUC watersheds according to the present condition of the water in lakes, rivers, and streams. The workgroup used only those data which concerned the water column, organisms living in the water, or the suitability of the water for supporting aquatic ecosystems. Each Alayer@ of information/data was partitioned by percentiles into scores. The scores ranged between one and five, with a score of one indicative of good water quality or minimum impairment, and a score of five indicating heavily impacted or degraded water quality. The scoring derived through the UWA process is presented in Table 2-1.

The data layers listed in Table 2-1 can be defined as:

- ◆ Lake Fishery: Large mouth bass community information for lakes
- ◆ Stream Fishery: Small mouth bass community information for streams
- ◆ Aquatic Life Use Support: The >livability= of the water column for aquatic life, determined from evaluation of chemical and physical water data, and assessment of aquatic life
- ◆ Fish Consumption Advisories: Site specific advisories based on current data
- ◆ Fish Index of Biotic Integrity: Based on fish community diversity and fish health
- ◆ Qualitative Habitat Evaluation Index: Measure of whether the aquatic habitat is suitable for diverse communities, based on visual observations
- ◆ Lake Trophic Scores: Indicator for the rate at which a lake is >aging= due to inputs of nutrients and other factors
- ◆ Sediment Potential: Indicator of potential sediment input to waterbodies in the watershed

The sources and additional information for these data layers include:

- ◆ Lake Fishery: From IDNR fisheries surveys of lakes and reservoirs from 1972 to 1994. Raw scores were averaged for all lakes in the watershed
- ◆ Stream Fishery: From IDNR fisheries surveys of streams from 1970 to 1994. Raw scores were averaged for all streams in the watershed
- ◆ Aquatic Life Use Support: IDEM, Office of Water Management, Assessment Branch
- ◆ Fish Consumption Advisories: ISDH and IDEM, Office of Water Management, Assessment Branch
- ◆ Fish Index of Biotic Integrity: IDEM, Office of Water Management, Assessment Branch
- ◆ Qualitative Habitat Evaluation Index: IDEM, Office of Water Management, Assessment Branch
- ◆ Lake Trophic Scores: Indiana Clean Lakes Program through IDEM, Office of Water Management, Assessment Branch. This score was based on information gathered from sampling conducted in the 1970's and 1980's
- ◆ Sediment Potential: U.S. Geological Survey scored the population rate of change and the 1996 Conservation Tillage Transect data. The scores were then added and normalized to produce a sediment yield indicator for each watershed

From this scoring, it is evident that it appears sedimentation, stream fishery, and aquatic life use support are the primary problems, with river biodiversity and lake trophic scores also a concern. The average score of all the indicators is 4.2, which indicates a watershed with severe impairments.



**TABLE 2-1**  
**RESULTS OF THE UNIFIED WATERSHED ASSESSMENT**  
**FOR HIGHLAND-PIGEON**

<b>Data/Information Layer</b>	<b>Highland-Pigeon (05140202) Score</b>
Stream Fishery	5
Aquatic Life Use Support	5
Fish Consumption Advisories	3
Lake Trophic Scores	4
River Biodiversity	4
Sediment Potential	5

Note:

The UWA scores range from one to five, with a score of one indicating good water quality and a score of five indicating severe impairment.

### **Indiana's 2000-2001 Unified Watershed Assessment (UWA)**

During summer 1999 the UWA workgroup used additional layers of information to identify the **resource concerns and stressors** for each of the 361 11-digit watersheds in Indiana. Examination of the human activities that have the potential to impact the ecosystem will help planners to focus on those areas where restoration may be most critical. Organizations can identify opportunities to use their programs and resources to address those areas.

This focusing process will illuminate areas where the interests of two or more partner agencies may converge. It is intended that this will lead to more effective allocation of resources for restoration and protection activities. At the local level, this information can assist groups to prioritize watershed activities and provide some discussion points for planning.

This amended assessment has the following benefits:

- ◆ Provides a logical process for targeting funds, which may be expanded or updated without changing the basic framework.
- ◆ Provides information at a finer resolution (11-digit hydrologic units) to agencies and local groups interested in watershed assessment.
- ◆ Identifies data gaps.
- ◆ Can be used as a compliment to other assessments, such as the 305(b) Report and 303(d) List.

Table 2-2 and Figure 2-1 show the results of the 2000-2001 UWA for the Highland-Pigeon watershed.

### 3 Identification of Impaired Waters

Section 303(d) of the Clean Water Act requires states to identify waters that do not or are not expected to meet applicable water quality standards with federal technology based standards alone. States are also required to develop a priority ranking for these waters taking into account the severity of the pollution and the designated uses of the waters. Indiana's 303(d) list was approved by EPA on February 16, 1999.

Once the Section 303(d) list and ranking of waters is completed, the states are required to develop Total Maximum Daily Loads (TMDLs) for these waters in order to achieve compliance with the water quality standards. The TMDL is an allocation that determines the point and nonpoint source (plus margin of safety) load reductions required in order for the waterbody to meet water quality standards. IDEM's Office of Water Management has and continues to perform point source waste load allocations for receiving waters. Part I of the WRAS briefly outlines IDEM's strategy for developing TMDLs.

The following Highland-Pigeon Watershed waterbodies are on Indiana's 1998 Clean Water Act Section 303(d) list submitted and approved by EPA 303(d) list (Figure 3-1):

- **Ohio River:** Fish consumption advisory for PCBs; Lead; E-coli (severity ranking: Medium)
- **Pigeon Creek:** Fish consumption advisory for PCBs; Organics; Chlordane (severity ranking: Low)

### 4 Priority Issues and Recommended Management Strategies

Part I provided the existing water quality information for the Highland-Pigeon watershed and Part II lists priority issues and concerns from local, state, and federal stakeholders in the watershed. This section pulls together the priority issues and concerns held by all stakeholders and recommends management strategies. Underlying all discussions of priority issues and concerns is the fact that improving water quality in the Highland-Pigeon Watershed will also enhance the natural and recreational values of Highland-Pigeon. Each subsection below focuses on a single priority issue.

#### 4.1 Planning Process and Plan Development

Many organized watershed groups or committees have difficulty developing watershed plans. Sometimes groups or committees try too hard to produce a document that is "perfect" or "complete." However, new information will always be available so the watershed plan will be a living document, updated periodically. The "process of involving and informing" the watershed community will determine the success of a watershed project. The talent and resources in a watershed community are invaluable. The planning process involves visioning, team building activities, goal setting, etc., as well as data inventory, implementation and monitoring. It is a constant evaluation that should be reviewed from the beginning, middle and end.

**Recommended Management Strategy 1:** Read and reference the documents, "Watershed Action Guide for Indiana" and "What Needs to be in a Watershed Management Plan" supplement (Obtain copies from IDEM, Office of Watershed Management). Leadership committees or groups should reference them at all stages of the watershed project.

**Recommended Management Strategy 2:** Use existing data, develop a plan of work, target areas, find funding sources, etc., and begin developing a watershed plan. Contact local, state and federal agencies that provide assistance in plan development.

## 4.2 Data\Information and Targeting

As in many of the watersheds in Indiana, there is a need for more water quality data and information in order to prioritize and target specific areas of the Highland-Pigeon watershed. In addition to targeting areas, there is also an identified need for more data and information about the actual impact on water quality from nonpoint sources. Success in restoring water quality in the Highland-Pigeon watershed is fundamentally based on identifying the specific geographic problem areas; identifying all sources contributing to the impairment of the waterbody; and quantifying the contribution of a pollutant by each source.

**Recommended Management Strategy 1:** Local SWCDs, natural resource agencies, cooperative county extension services, and other interested personnel, need to gather and analyze existing water quality data, natural resource information and other information pertinent to the area. Communication and the sharing of this data and information should be provided at a meeting sponsored by the Soil and Water Conservation Districts or a interested group.

**Recommended Management Strategy 2:** Once all the information and data is shared, a "plan of work" should be developed. The "plan of work" basically outlines what direction the local stakeholders will take involving more stakeholders, obtaining additional information, formulation of committee(s), time frame of events, etc.

**Recommended Management Strategy 3:** Inform the public about the past, present, and future desired condition of the watershed or watershed areas that will be improved upon. If possible run a series of articles or radio updates about each assessed tributary of the watershed. Present the findings whether an impairments exists or not. This will help build community support if a project is further developed.

**Recommended Management Strategy 4:** Target and prioritize watershed areas that are creating possible impairments to a waterbody. Targeting and prioritization should be managed at the 14 digit HUC watershed area (Figure 2-2 of Part I). The targeting and prioritization will require input from stakeholders living in those geographic areas. The purpose of this prioritization and targeting is to enhance allocation of resources in the effort of improving water quality.

**Recommended Management Strategy 5:** Encourage the public to participate in water quality monitoring. Stream and macro invertebrate assessments are good measures of progress.

### 4.3 Failing Septic Systems and Straight Pipe Discharges

Local county health departments and other stakeholders have identified failing septic systems and straight pipe discharge from septic tanks as significant sources of water pollution in the Highland-Pigeon watershed. Straight pipe discharges from septic tanks and septic tanks connected to drainage tiles are illegal (327 IAC 5-1-1.5); however, these practices are ongoing in the Highland-Pigeon watershed.

**Recommended Management Strategy:** All of the County Health Departments have stressed that more education is needed pertaining to septic system management. Providing demonstrations, field days, or workshops for the public in order to provide more information on the impacts of failed septic systems, regulations, alternative treatment systems, and financial assistance maybe a good start. Local stakeholders could partner to help share in the cost of this program. To further these educational efforts, the direct impact of communities discharging their septic tank effluent to waterbodies needs to be adequately characterized. This will involve coordination between the County Health Departments, the Indiana State Department of Health, and other stakeholders. The option of choice to eliminate the illegal discharges will be a cooperative effort between homeowners and local, state, and federal stakeholders. If a cooperative solution can not be reached, illicit dischargers will be required to cease discharge.

### 4.4 Water Quality - General

The Clean Water Act Section 303(d) list presented in Section 3 lists water quality limited waterbodies for the Highland-Pigeon Creek watershed.

**Recommended Management Strategy:** The Clean Water Act requires states to complete TMDLs for waterbodies listed on the Section 303(d) list. The Office of Water Management is currently evaluating and exploring the modeling process and data needs required to complete TMDLs for the Section 303(d) listed waterbodies in the Highland-Pigeon watershed. Completion of a TMDL will involve loading allocations of a pollutant to both point and nonpoint sources. The Office of Water Management is currently drafting a TMDL strategy that involves stakeholder input throughout the process.

### 4.5 Fish Consumption Advisories

As noted in Part I and Part II, fish consumption advisories are a major concern in the Ohio River and also for Pigeon Creek.

**Recommended Management Strategy 1:** Any person eating fish from the Ohio River or Pigeon Creek should check the fish consumption advisory every year and follow the recommendations. Soil and Water Conservation Districts could run yearly spring articles about fish consumption recommendations through local media sources or their newsletter.

### 4.6 Nonpoint Source Pollution - General

Nonpoint source pollution contributions are often difficult to assess or quantify. Currently, loadings of nonpoint source pollutants to water are often inferred by examination of land use practices, without actual measurements. In addition, the actual water quality impairments related to nonpoint source pollutants have not been well characterized in the Highland-Pigeon watershed. Finally, very few regulatory control mechanisms exist to control nonpoint source pollution.

**Recommended Management Strategy 1:** Numerous funding mechanisms, such as Conservation Reserve Program, Environmental Quality Incentive Program, Lake and River Enhancement program, and 319(h) grants, exist to promote practices to reduce nonpoint source pollution in the watershed. The prioritization and targeting discussed previously in Part II should be used to allocate further application of resources.

#### **4.7 Point Sources - General**

During the 1998 Intensive Sampling by the Office of Water Management, several permitted dischargers were found to be discharging in excess of their permit limits. In addition, illicit point source discharges, such as tiles discharging septic tank effluent, exist in the watershed.

**Recommended Management Strategy:** The Permitting and Compliance Branch of IDEM's Office of Water Management is responsible for issuing and monitoring compliance of NPDES permit holders. Clearly, more emphasis and resources are needed to identify and correct illicit point sources and non-complying point sources. Improving compliance of NPDES dischargers and identifying illicit dischargers will involve fostering a working relationship with other local, state, and federal stakeholders to monitor compliance and report unusual discharges or stream appearance. In regards to illicit discharges, the Office of Water Management will work with local, state, and federal stakeholders to identify and eliminate these sources of water pollution.

## 5 Future Expectations and Actions

As discussed in Part I, this Watershed Restoration Action Strategy is intended to be fluid document that will be revised or amended as new information becomes available. Section 5.1 discusses expectations derived from the Strategy and how progress will be measured. Specific revisions and amendments to the Watershed Restoration Action Strategy are discussed in Section 5.2. Finally, the Watershed Restoration Action Strategy will be reviewed by all stakeholders before it becomes final, as described in Section 5.3.

### 5.1 Expectations and Measuring Progress

The Highland-Pigeon Strategy provides a starting point to address water quality concerns held by local, state, and federal stakeholders. Part II provides recommended management strategies to address these concerns. Through cooperative efforts with stakeholders, all of the recommended management strategies listed will begin implementation by the summer of 2000.

Measurement of progress is critical to the success of any plan. Water quality improvements will not take place overnight. Measuring of progress in terms of water quality will be provided through the Office of Water Management Assessment Branch's rotating basin monitoring strategy. Specifically, they will be conducting sampling again during 2000. This will allow an assessment of progress in improving water quality.

### 5.2 Expected Revisions and Amendments

This Watershed Restoration Action Strategy is intended to provide a starting point to improve water quality and measure the improvement. Hence, this document will require revisions and amendments as new information becomes available. The future revisions and amendments have been divided into those that are expected within the next year (Section 5.2.1) and those that will occur over a long-term basis (Section 5.2.2).

#### *5.2.1 Short Term Revisions and Amendments*

The most significant revisions and amendments will likely occur during 2001 and after, as a result of the rotating basin assessments to be completed during 2001. The Section 305(b) assessments will be completed by late 1999 or early 2000. Local, state, and federal stakeholder comments regarding the Watershed Restoration Action Strategy will be addressed in future revisions of the document.

#### *5.2.2 Long Term Revisions and Amendments*

The Office of Water Management is moving toward adopting a watershed management approach to solve water quality problems. Part of the watershed approach is the use of a rotating basin management cycle. The Assessment Branch of the Office of Water Management has already adopted this rotating basin cycle in its intensive monitoring and assessment of

Indiana waterbodies (this is in addition to the already established fixed monitoring station monitoring which occurs on a monthly basis). Based on the cycle the Assessment Branch is using, the next intensive monitoring of the Highland-Pigeon watershed will occur during the sampling season of 2001. The information from the 2001 monitoring effort will be incorporated into the Watershed Restoration Action Strategy.

In addition, the Watershed Restoration Action Strategy may be revised or amended prior to 2001, if sufficient information becomes available.

### **5.3 Review of the Watershed Restoration Action Strategy**

Before this Watershed Restoration Action Strategy becomes final, it will undergo rigorous review. The first stage of review will be performed internally by the Office of Water Management. Once the Watershed Restoration Action Strategy has been revised to address internal Office of Water Management comments, it will be circulated to local, state, and federal stakeholders in the watershed and meetings within the watershed will be held to discuss the document. Written comments from local, state, and federal stakeholders will be addressed and the Watershed Restoration Action Strategy will again be revised to incorporate applicable comments. Once internal and external comments have been addressed, the final version of the Watershed Restoration Action Strategy will be released.

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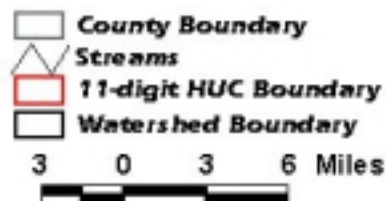
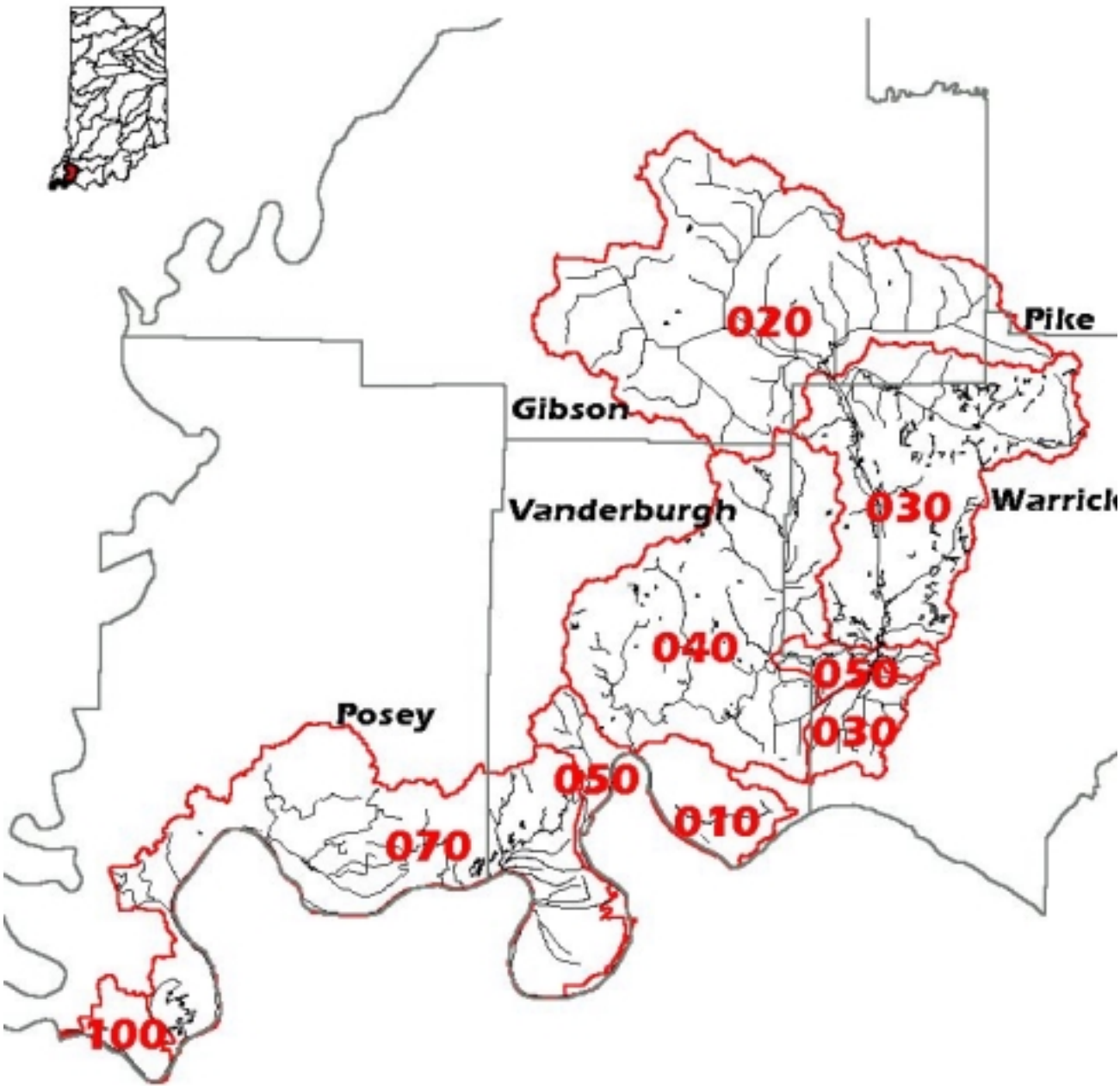
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HYDROLOGIC UNIT SCORES for Each Parameter Used in the Unified Watershed Assessment [2000-2001]																
11 Digit Hydrologic Unit		Mussel Diversity and Occurrence	Aquatic Life Use Support	Recreational Use Attainment	Stream Fishery	Lake Fishery	Eurasian Milfoil Infestation Status	Lake Trophic Status	Critical Biodiversity Resource	Aquifer Vulnerability	Population Using Surface Water for Drinking Water	Residential Septic System Density	Degree of Urbanization	Density of Livestock	% Cropland	Mineral Extraction Activities
Highland-Pigeon	05140202010	2	nd	nd	nd	nd	nd	nd	2	2	5	2	4	1	2	3
	05140202020	nd	nd	nd	nd	nd	nd	nd	2	3	5	2	2	3	4	4
	05140202030	nd	nd	nd	nd	nd	nd	nd	3	3	5	2	2	2	1	5
	05140202040	nd	nd	nd	nd	nd	nd	nd	2	3	5	4	3	1	2	4
	05140202050	2	nd	nd	nd	nd	nd	nd	3	2	5	5	3	1	2	4
	05140202070	2	nd	nd	nd	nd	nd	nd	4	3	5	4	2	2	3	3
	05140202100	nd	nd	nd	nd	nd	nd	nd	4	2	3	1	1	2	4	3

nd no data

Score 1 through 5, with a score of 5 indicating the most concern.

# Highland Pigeon Watershed



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